

IN THE CLAIMS:

1. (Original) An electrical circuit in a communications channel, comprising:
 - a first sub-circuit having a first input which receives a composite signal that includes a transmission signal component and a receive signal component, a second input which receives a replica transmission signal, a third input which receives a common-mode shift current, and an output which provides a receive signal which comprises the composite signal minus the replica signal; and
 - a second sub-circuit for controlling the common-mode shift current, so that the magnitude of the composite signal does not exceed a predetermined value of an operating parameter of the electrical circuit.
2. (Original) The electrical circuit of claim 1, further comprising a power supply voltage source of a predetermined magnitude, wherein the operating parameter is the predetermined magnitude of the power supply voltage source.
3. (Original) The electrical circuit of claim 1, wherein the second sub-circuit includes a common-mode feedback circuit.
4. (Original) The electrical circuit of claim 3, wherein the common-mode feedback circuit includes an operational amplifier.
5. (Original) The electrical circuit of claim 4, wherein the operational amplifier has a first input which receives a first differential component of the composite signal, a second input which receives a second differential component of the composite signal, a third input which receives a common-mode voltage signal, and an output which provides a common-mode shift current control signal.
6. (Original) The electrical circuit of claim 5, wherein the common-mode feedback circuit further includes a pair of transistors, each transistor having a respective input

and wherein the output of the operational amplifier is coupled to the respective input of each of the transistors.

7. (Original) The electrical circuit of claim 1, wherein the second sub-circuit includes a current source.

8. (Original) The electrical circuit of claim 7, wherein the current source provides a constant common-mode shift current control signal.

9. (Original) The electrical circuit of claim 1, wherein the second sub-circuit includes a resistor divider.

10. (Original) The electrical circuit of claim 9, wherein the resistor divider comprises a plurality of resistors, each of the resistors having a respective characteristic resistance.

11. (Original) The electrical circuit of claim 10, wherein the resistor divider provides a common-mode shift current control signal that is related to the respective resistances of each of the resistors.

12. (Original) An electrical circuit in a communications channel, comprising:
an active resistive summing circuit which produces a receive signal as a difference between a composite signal and a replica transmission signal, the composite signal comprising a transmission signal component and a receive signal component; and
a common-mode shift current control circuit which controls the magnitude of the composite signal.

13. (Original) The electrical circuit of claim 12, further comprising a power supply voltage source of a predetermined magnitude.

14. (Original) The electrical circuit of claim 13, wherein the common-mode shift current control circuit controls the magnitude of the composite signal to be less than the magnitude of the power supply voltage source.

15. (Original) The electrical circuit of claim 12, wherein the common-mode shift current control circuit includes a common-mode feedback circuit.

16. (Original) The electrical circuit of claim 15, wherein the common-mode feedback circuit includes an operational amplifier.

17. (Original) The electrical circuit of claim 16, wherein the operational amplifier has a first input which receives a first differential component of the composite signal, a second input which receives a second differential component of the composite signal, a third input which receives a common-mode voltage signal, and an output which provides a common-mode shift current control signal.

18. (Original) The electrical circuit of claim 17, wherein the common-mode feedback circuit further includes a pair of transistors, each transistor having a respective input and wherein the output of the operational amplifier is coupled to the respective input of each of the transistors.

19. (Original) The electrical circuit of claim 12, wherein the common-mode shift current control circuit includes a current source.

20. (Original) The electrical circuit of claim 19, wherein the current source provides a constant common-mode shift current control signal.

21. (Original) The electrical circuit of claim 12, wherein the common-mode shift current control circuit includes a resistor divider.

22. (Original) The electrical circuit of claim 21, wherein the resistor divider comprises a plurality of resistors, each of the resistors having a respective characteristic resistance.

23. (Original) The electrical circuit of claim 22, wherein the resistor divider provides a common-mode shift current control signal that is related to the respective resistances of each of the resistors.

24. (Original) An electrical circuit in a communications channel, comprising:
an active resistive summer having a first input which receives a composite signal that includes a transmission signal component and a receive signal component, a second input which receives a replica transmission signal, a third input which receives a common-mode shift current, and an output which provides a receive signal which comprises the composite signal minus the replica signal; and
a common-mode shift current control circuit which controls the magnitude of the common-mode shift current to thereby control the magnitude of the composite signal.

25. (Original) The electrical circuit of claim 24, further comprising a power supply voltage source of a predetermined magnitude.

26. (Original) The electrical circuit of claim 25, wherein the magnitude of the common-mode shift current is controlled to control the magnitude of the composite signal to be less than the magnitude of the power supply voltage source.

27. (Original) The electrical circuit of claim 25, wherein the magnitude of the common-mode shift current is controlled to control the magnitude of the composite signal to be equal to the magnitude of the power supply voltage source.

28. (Original) The electrical circuit of claim 24, wherein the common-mode shift current circuit includes a common-mode feedback circuit.

29. (Original) The electrical circuit of claim 28, wherein the common-mode feedback circuit includes an operational amplifier.

30. (Original) The electrical circuit of claim 29, wherein the operational amplifier has a first input which receives a first differential component of the composite signal, a second input which receives a second differential component of a composite signal, a third input which receives a common-mode voltage signal, and an output which provides a common-mode shift current control signal.

31. (Original) The electrical circuit of claim 30, wherein the common-mode feedback circuit further includes a pair of transistors, each transistor having a respective input and wherein the output of the operational amplifier is coupled to the respective input of each of the transistors.

32. (Original) The electrical circuit of claim 24, wherein the common-mode shift current control circuit includes a current source.

33 (Original) The electrical circuit of claim 32, wherein the current source provides a constant common-mode shift current control signal.

34. (Original) The electrical circuit of claim 24, wherein the common-mode shift current control circuit includes a resistor divider.

35. (Original) The electrical circuit of claim 34, wherein the resistor divider comprises a plurality of resistors, each of the resistors having a respective characteristic resistance.

36. (Original) The electrical circuit of claim 35, wherein the resistor divider provides a common-mode shift current control signal that is related to the respective resistances of each of the resistors.

37. (Original) A communication method for a communications channel, comprising:

receiving at a first input a composite signal that includes a transmission signal component and a receive signal component;

receiving at a second input a replica transmission signal;

receiving at a third input a common-mode shift current;

providing a common-mode shift current to substantially prevent the magnitude of the composite signal from exceeding a predetermined value of an operating parameter of the electrical circuit; and

providing a receive signal comprising the composite signal minus the replica signal at an output.

38. (Original) The method of claim 37, further comprising providing a power supply voltage source of a predetermined magnitude, wherein the operating parameter is the predetermined magnitude of the power supply voltage source.

39. (Original) The method of claim 37, wherein the common-mode shift current is provided by a common-mode feedback circuit.

40. (Original) The method of claim 39, wherein the common-mode feedback circuit includes an operational amplifier.

41. (Original) The method of claim 40, further comprising:

receiving a first differential component of the composite signal at a first input of the operational amplifier;

receiving a second differential component of the composite signal at a second input of the operational amplifier;

receiving a common-mode voltage signal at a third input of the operational amplifier; and

providing a common-mode shift current control signal at an output of the operational amplifier.

42. (Original) The method of claim 41, further comprising receiving the common-mode shift current control signal at an input of a first transistor and at an input of a second transistor.

43. (Original) The method of claim 37, wherein the common-mode shift current is provided by a current source.

44. (Original) The method of claim 43, further comprising the step of providing a constant common-mode shift current.

45. (Original) The method of claim 37, wherein the common-mode shift current is provided by a resistor divider.

46. (Original) The method of claim 45, wherein the resistor divider comprises a plurality of resistors, each resistor having a respective characteristic resistance.

47. (Original) The method of claim 46, wherein the common-mode shift current is related to the respective resistances of each of the resistors.

48. (Currently Amended) A communication method for a communications channel, comprising:

producing a receive signal as a difference between a composite signal and a replica transmission signal, the composite signal comprising a transmission signal component and a receive signal component; and

controlling the magnitude of the composite signal by controlling a common-mode shift current.

49. (Original) The method of claim 48, further comprising providing a power supply voltage source of a predetermined magnitude.

50. (Original) The method of claim 49, wherein the magnitude of the composite signal is controlled to be less than the magnitude of the power supply voltage source.

51. (Original) The method of claim 49, wherein the magnitude of the composite signal is controlled to be equal to the power supply voltage source.

52. (Original) The method of claim 48, wherein the magnitude of the composite signal is controlled by a common-mode feedback circuit.

53. (Original) The method of claim 52, wherein the common-mode feedback circuit includes an operational amplifier.

54. (Original) The method of claim 53, further comprising:
receiving at a first input a first differential component of the composite signal;
receiving at a second input a second differential component of the composite signal;
receiving at a third input a common-mode voltage signal; and
providing at an output a common-mode shift current control signal.

55. (Original) The method of claim 54, further comprising providing the output of the operational amplifier to an input of a first transistor and an input of a second transistor.

56. (Original) The method of claim 48, wherein the magnitude of the composite signal is controlled by a current source.

57. (Original) The method of claim 56, further comprising providing a constant common-mode shift current control signal to control the magnitude of the composite signal.

58. (Original) The method of claim 48, wherein the magnitude of the composite signal is controlled by a resistor divider.

59. (Original) The method of claim 58, wherein the resistor divider comprises a plurality of resistors, each of the resistors having a respective characteristic resistance.

60. (Original) The method of claim 59, further comprising controlling the magnitude of the composite signal in relation to the respective resistances of each of the resistors.

61. (Original) A method for a communications channel comprising:
receiving at a first input a composite signal that includes a transmission signal component and a receive signal component;
receiving at a second input a replica transmission signal;
receiving at a third input a common-mode shift current;
controlling the magnitude of the common-mode shift current to thereby control the magnitude of the composite signal; and
providing at an output a receive signal which comprises the composite signal minus the replica signal.

62. (Original) The method of claim 61, further comprising providing a power supply voltage source of a predetermined magnitude.

63. (Original) The method of claim 62, wherein the magnitude of the common-mode shift current is controlled to control the magnitude of the composite signal to be less than the magnitude of the power supply voltage source.

64. (Original) The method of claim 62, wherein the magnitude of the common-mode shift current is controlled to control the magnitude of the composite signal to be equal to the magnitude of the power supply voltage source.

65. (Original) The method of claim 61, wherein the magnitude of the common-mode shift current is controlled by a common-mode feedback circuit.

66. (Original) The method of claim 65, wherein the common-mode feedback circuit includes an operational amplifier.

67. (Original) The method of claim 66, further comprising:
receiving at a first input a first differential component of the composite signal;
receiving at a second input a second differential component of the composite signal;
receiving at a third input a common-mode voltage signal; and
providing at an output a common-mode shift current control signal.

68. (Original) The method of claim 67, further comprising providing the output of the operational amplifier to an input of a first transistor and an input of a second transistor.

69. (Original) The method of claim 61, wherein the magnitude of the common-mode shift current is controlled by a current source.

70. (Original) The method of claim 69, further comprising providing a constant common-mode shift current control signal.

71. (Original) The method of claim 61, wherein the magnitude of the common-mode shift current is controlled by a resistor divider.

72. (Original) The method of claim 71, wherein the resistor divider comprises a plurality of resistors, each of the resistors having a respective characteristic resistance.

73. (Original) The method of claim 72, further comprising providing a common-mode shift current control signal that is related to the respective resistances of each of the resistors.

74. (Currently Amended) An electrical circuit for a communications channel, comprising:

means for receiving at a first input a composite signal that includes a transmission signal component and a receive signal component;

means for receiving at a second input a replica transmission signal;

means for receiving at a third input a common-mode shift current;

means for providing a receive signal comprising the composite signal minus the replica signal; and

means for providing a common-mode shift current to substantially prevent the magnitude of the composite signal from exceeding a predetermined value of an operating parameter of the electrical circuit.

75. (Original) The electrical circuit of claim 74, further comprising means for providing a power supply voltage source of a predetermined magnitude, wherein the operating parameter is the predetermined magnitude of the power supply voltage source.

76. (Original) The electrical circuit of claim 74, wherein the common-mode shift current is provided by a common-mode feedback circuit means.

77. (Original) The electrical circuit of claim 76, wherein the common-mode feedback circuit means includes operational amplifier means.

78. (Original) The electrical circuit of claim 77, further comprising:
means for receiving a first differential component of the composite signal at a first input of the operational amplifier means;
means for receiving a second differential component of the composite signal at a second input of the operational amplifier means;
means for receiving a common-mode voltage signal at a third input of the operational amplifier; and
means for providing a common-mode shift current control signal at an output of the operational amplifier means.

79. (Original) The electrical circuit of claim 78, further comprising means for providing the common-mode shift current control signal at an input of a first transistor and at an input of a second transistor.

80. (Original) The electrical circuit of claim 74, wherein current source means provide the common-mode shift current.

81. (Original) The electrical circuit of claim 80, further comprising means for providing a constant common-mode shift current.

82. (Original) The electrical circuit of claim 74, wherein resistor divider means provide the common-mode shift current.

83. (Original) The electrical circuit of claim 82, wherein the resistor divider means comprises a plurality of resistors, each resistor having a respective characteristic resistance.

84. (Original) The electrical circuit of claim 83, wherein the common-mode shift current is related to the respective resistances of each of the resistors.

85. (Currently Amended) An electrical circuit for a communications circuit, comprising:

means for producing a receive signal as a difference between a composite signal and a replica transmission signal, the composite signal comprising a transmission signal component and a receive signal component; and

means for controlling the magnitude of the composite signal by controlling a common-mode shift current.

86. (Original) The electrical circuit of claim 85, further comprising means for providing a power supply voltage source of a predetermined magnitude.

87. (Original) The electrical circuit of claim 86, wherein the means for controlling the magnitude of the composite signal control the magnitude of the composite signal to be less than the magnitude of the power supply voltage source.

88. (Original) The electrical circuit of claim 86, wherein the means for controlling the magnitude of the composite signal control the magnitude of the composite signal to be equal to the magnitude of the power supply voltage source.

89. (Original) The electrical circuit of claim 85, wherein the magnitude of the composite signal is controlled by common-mode feedback circuit means.

90. (Original) The electrical circuit of claim 89, wherein the common-mode feedback circuit means include operational amplifier means,

91. (Original) The electrical circuit of claim 90, further comprising:
means for receiving at a first input a first differential component of the composite signal;

means for receiving at a second input a second differential component of the composite signal;

means for receiving at a third input a common-mode voltage signal; and

means for providing at an output a common-mode shift current control signal.

92. (Original) The electrical circuit of claim 91, further comprising means for providing the output of the operational amplifier means to an input of a first transistor and an input of a second transistor.

93. (Original) The electrical circuit of claim 85, wherein the magnitude of the composite signal is controlled by current source means.

94. (Original) The electrical circuit of claim 93, further comprising means for providing a constant common-mode shift current control signal to control the magnitude of the composite signal.

95. (Original) The electrical circuit of claim 85, wherein the magnitude of the composite signal is controlled by resistor divider means.

96. (Original) The electrical circuit of claim 95, wherein the resistor divider means comprises a plurality of resistors, each of the resistors having a respective characteristic resistance.

97. (Original) The electrical circuit of claim 96, further comprising means for controlling the magnitude of the composite signal in relation to the respective resistances of each of the resistors.

98. (Original) An electrical circuit for a communications channel, comprising:
means for receiving at a first input a composite signal that includes a transmission
signal component and a receive signal component;
means for receiving at a second input a replica transmission signal;
means for receiving at a third input a common-mode shift current;
means for controlling the magnitude of the common-mode shift current to thereby
control the magnitude of the composite signal; and
means for providing at an output a receive signal which comprises the composite
signal minus the replica signal.

99. (Original) The electrical circuit of claim 98, further comprising means for
providing a power supply voltage source of a predetermined magnitude.

100. (Original) The electrical circuit of claim 99, wherein the means for
controlling the magnitude of the common-mode shift current is controlled to be less than the
magnitude of the means for providing a power supply voltage source of a predetermined
magnitude.

101. (Original) The electrical circuit of claim 99, wherein the means for
controlling the magnitude of the common-mode shift current is controlled to be equal to the
magnitude of the means for providing a power supply voltage source of a predetermined
magnitude

102. (Original) The electrical circuit of claim 99, the magnitude of the common-
mode shift current is controlled by common-mode feedback circuit means.

103. (Original) The electrical circuit of claim 102, wherein the common-mode
feedback circuit means includes operational amplifier means.

104. (Original) The electrical circuit of claim 103, further comprising:
means for receiving at a first input a first differential component of the composite signal;

means for receiving at a second input a second differential component of the composite signal;

means for receiving at a third input a common-mode voltage signal; and

means for providing at an output a common-mode shift current control signal.

105. (Original) The electrical circuit of claim 104, further comprising means for providing the output of the operational amplifier to an input of a first transistor and an input of a second transistor.

106. (Original) The electrical circuit of claim 98, wherein the magnitude of the common-mode shift current is controlled by current source means.

107. (Original) The electrical circuit of claim 106, further comprising means for providing a constant common-mode shift current control signal.

108. (Original) The electrical circuit of claim 98, wherein the magnitude of the common-mode shift current is controlled by resistor divider means.

109. (Original) The electrical circuit of claim 108, wherein the resistor divider means comprises a plurality of resistors, each of the resistors having a respective characteristic resistance.

110. (Original) The electrical circuit of claim 109, further comprising means for providing a common-mode shift current control signal that is related to the respective resistances of each of the resistors.